VHFER

50 MC. AND UP

LEARN BY DOING

Volume 4, No. 1 January, 1966

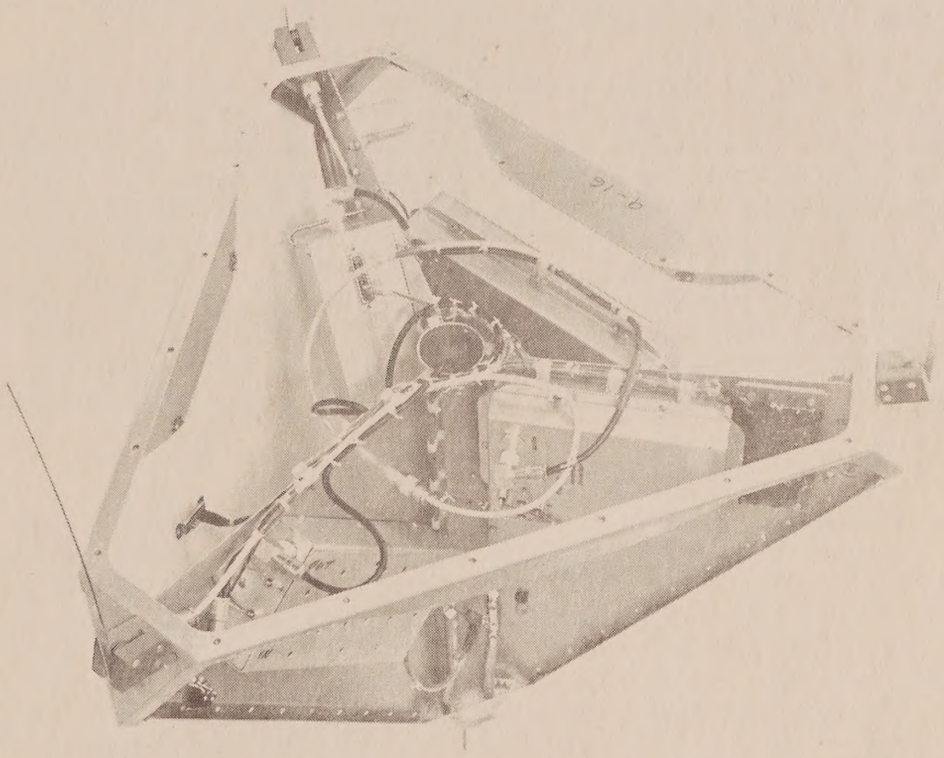

Figure 1

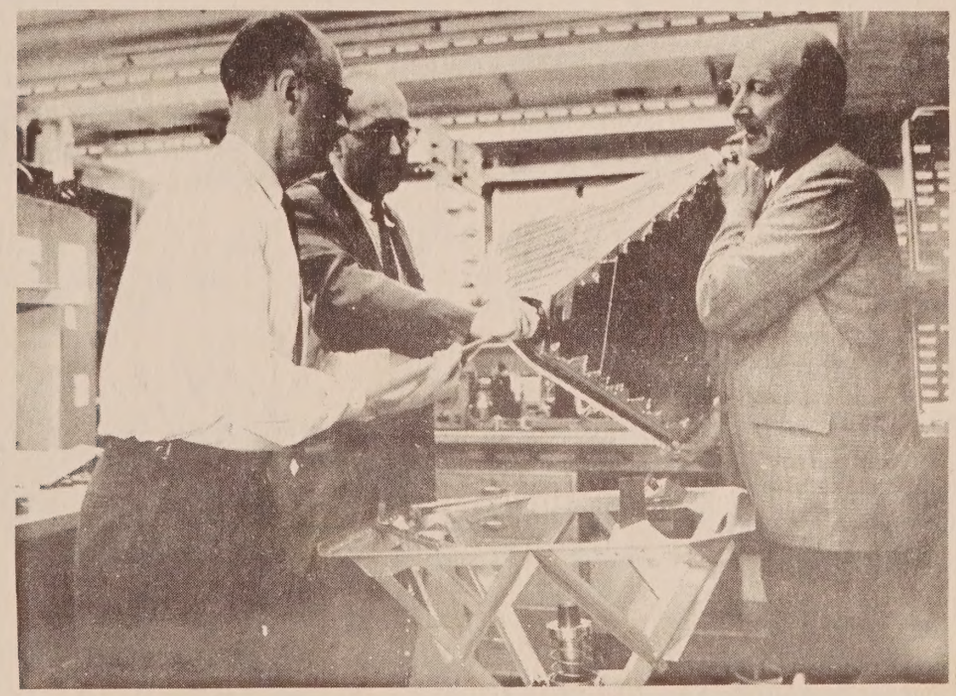

Figure 2

OSCAR IV

OSCAR NEWSLETTER

January 1966

OSCAR IV, the radio amateur repeater satellite was launched in orbit on December 21, 1965 at 1400 GMT aboard a Titan III vehicle from Cape Kennedy, Florida. The launch was observed by W6SAI, W6UF and K6GSJ. Liaison with Oscar Headquarters in California was maintained on 14 mc/s SSB via W6EE/4 located at Cocoa Beach, Florida. Oscar IV was ejected from the Transtage (final stage) of the Titan III vehicle at 2022 GMT. The Titan payload also included the LES 3 and 4 satellites and the OV2-3 satellite. Because of a malfunction in the Titan control system, the planned near-synchronous orbit was not achieved. Instead, Oscar IV was placed in a highly elliptical orbit having the following characteristics (as of orbit 15): Perigee, 103 nautical miles (188.5 km); apogee, 18,200 nautical miles (33,206 km); inclination, 26 degrees; period, 587.5 minutes. The period decays approximately 7.5 seconds per orbit. At start of orbit 15 (December 27, 1965) the equatorial crossing time (south-to-north) was 1824 GMT and the crossing point was 254° west longitude.

First reports indicate that the beacon sequence was essentially continuous. WA6BPZ (Sunnyvale, California) heard the Oscar IV beacon at 2028 GMT, six minutes after ejection. The beacon was measured at 431.928 mc/s and the translator passband at 431.940--431.945 mc/s. Translator input center frequency was checked at 144.1 mc/s. First reported reception of translated signals was by W6YK who heard WB6KAP, K4IXC and W4WNH on orbit Ø. First reported QSO via Oscar IV was W6YK--W4AWS on orbit Ø. K2MWA/2 reports the following European signals heard via Oscar IV: HB9RG, DL3YBA, G3LTF and DL9AR. VK2AAK reports VK7PF; and OH2AZT reports G3LTF, DL3YBA and OH2DV. Other reported QSO's include: DL9AR-DLØLB (orbit 2), W6GDO-K6HCP (orbit 5), W6GDO-W5WXZ (orbit 10), WA2WEB-K2MWA/2 (orbit 12), W6GDO-W6FZA (orbit 15). VK7PF reported hearing both ends of the W6GDO-W6FZA QSO! VK3ASG heard VK6HK for the first reception across Australia!

It is believed that Oscar IV was ejected from the Transtage of the Titan III vehicle with the satellite antennas pointing at the earth. Further data indicates that one of the sets of solar panels may have been damaged by excessive temperature during the six hour "transfer" flight. If so, the primary voltage supply of Oscar IV may be lower than normal, thus inactivating the "clock" designed to switch the beacon transmitter on and off. As of orbit 15, the beacon signal had "captured" the translator for most of the time, only permitting the translator to function properly for periods of 15 seconds or less. The resulting signal from Oscar IV resembles a steady carrier at 431.928 mc/s, broken at irregular intervals by incomplete H-I identification signals, with occasional longer pauses during which it is possible to make use of the translator equipment. Reports also indicate that the translator may be useable even while the beacon signal is on.

The following calls have been reported heard through Oscar IV; W6GDO, W6PUZ, W5AJG, W4AWS, W5WXZ, K7GIR, WA2WEB, W9AAG, KØRZJ, W8YIO, W6FZA, K7ZER, W7LIT, K6HCP, KØRZI, K2MWA/2, W4WNH, K2GUG, W9ZIH, K6HAW, W6YK, W6GHV, G3LTS, DL3YBA, OH2DV, W4GJO, W5HCJ, W9EGB, K6TSK, K9AAJ, W9TGB, WØIC, W4IKC, WB6KAL, WB6IOM, K6HAA, K2GUN, VK7PF, W5SLL, WØLER, K4FJT, K2VTW, DL3YBW, G3LTF, DL9AR, K7DZG.

Project Oscar requests reports of all calls heard, QSO's achieved, and signal strength reports of the beacon versus translated signals. Those experimenters having large antenna arrays are requested to give AZ-EL data: 10 to 30 readings at 1 to 5 minute intervals are urgently needed. Send all reports to Project Oscar, Foothill College, Los Altos Hills, California, U.S.A.

Oscar Headquarters station W6EE will broadcast prediction bulletins and news according to the following schedule: Thursday and Sunday (GMT) only. Single sideband, 3835, 7235 and 14235 kc/s at 0400 GMT. CW, 3507.5, 7015 and 14030 kc/s at 0415 GMT. RTTY, 3625, 7040 and 14090 at 0445 GMT (remember, these times fall on Wednesday and Saturday evenings in the U.S.A.).

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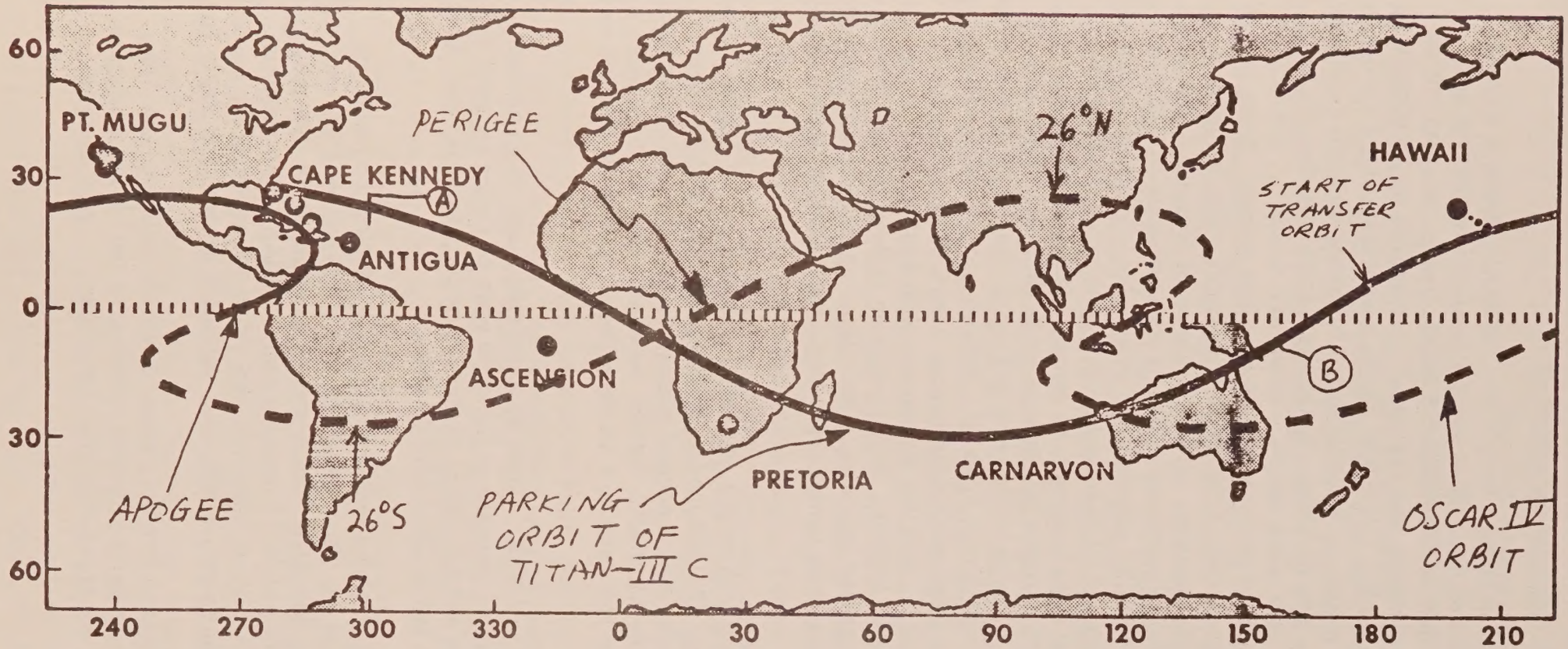
THE OSCAR IV SUB-SATELLITE TRACK



This map illustrates the sub-satellite track of the Oscar IV orbit on the surface of the earth (dash line). The Titan III vehicle was fired from Cape Kennedy, Florida (solid line). First burn of the engines lasted to point A, placing the vehicle in a 95 nautical mile high "parking orbit" lasting to point B. At this point, the engine refired to place the vehicle in an elliptical "transfer orbit," starting west of Hawaii. The transfer orbit quickly lifted the Titan III Transtage to about 18,200 nautical miles altitude over the United States, the orbit being at an inclination of approximately 26° to the equator. At the apogee point over the Galapagos Islands, the Transtage engine was programmed to fire again, placing the stage in a near-synchronous orbit at a zero inclination angle to the equator. The last of these highly complicated maneuvers was not carried out, and Oscar IV was ejected in the elliptical "transfer orbit." The orbit is S-shaped about the apogee point as Oscar IV is traveling slowly over this portion of the ellipse and the earth observer "races ahead" of the satellite, only to "slow down" as Oscar IV picks up speed on the "downward" portion of the elliptical orbit. When Oscar IV is traveling on the "outward" portion of the orbit, it is north of the equator (to a maximum of 26°) and when the satellite is traveling on the "downward" portion of the orbit, it is south of the equator (to a maximum of 26°). Progression is 147.53° per orbit. This starting condition is gradually changing and the perigee (low point of orbit) is slowly drifting away from the equator.

Oscar IV designation: Spacetrack object 1902.
International- 1965-108-C

The following is taken directly from the OSCAR newsletter and is titled "Reading the Mail." It is re-typed because we couldn't copy it photographically with good enough quality for publication.

K7DZG: Sounds as if Oscar's passband is about 9 kc/s wide...W9AAG: Heard a VE3?? but some bird calling at 5 wpm ruined this one. Best signals heard were W6FZA and K7ZIR. Better luck next time on the taxi service-HI....K2GUN: Beacon is about +35 db over noise on orbit 2. Using Parks converter and 15L Quad....W4AWS: Heard W6GHV on orbit 5. Translator chopping signals badly....W5CKY: Parks converter and 8 x 8 J-Beam here. Chirpy, unidentifiable signals heard....W4GJO: Heard following on orbit 6--W6GDO, K5WXZ, W6HCJ. Orbit 7-W4WNH....KØIJN: Think I heard a VK station on Jan. 2!!... WA9HUV: Heard K6HCP on Dec. 21, plus many others. Using 64L array.... W8FAZ: Suggest you listen for Oscar at low point of orbit as signals are very strong. Don't forget to mention the satellite signals stop in shadow of the earth because of solar cell power supply. Many amateurs don't know this happens.... W6YK: Using 64 element J-Beam on 144 and 32 elements on 432 mc/s & Parks converter. Ran at about 25 wpm in QSO with W4AWS .. W2BLV: Heard W9ZIH and K9AAJ about +18 db over noise. The beacon seemed to be operating at the same time. Using 40 element colinear on 432 mc/s....W4WNH: Beacon +20 db over noise with relayed signals almost as strong. Using 6CW4 converter and helix on AZ-EL mount....W6ELT: On orbit 25, beacon +7 db over noise with W6PUZ heard in noise....K2ACQ: Using 128 element colinear on 432 mc/s. Heard K6HCP on orbit 3...WA9NKT: Only pieces of calls heard during orbit 20. W6GHV and K6TSK heard earlier. W1HDQ: Severe TV interference from local station but beacon heard +3 to +6 db over racket. Many fragmentary calls heard....W2IMU: Frequency shift keying (FSK) tests with K2GUN provided increased readability of signals. Major problem is deep fading. We recommend circular polarization for all ground antennas. Translator passband re-measured to show useful to plus or minus 15 kc/s from center frequency. Response is 15 db down at these frequencies....

VK7PF: Acquired beacon at 1047Z 24/12/65 on 431.928 mc/s. During the 55 minute track-in period the beacon frequency reached 431.932 mc/s. With acquisition, VK7PF began transmitting CW and was able to receive his translated signals clearly for almost the whole of the period. He was heard clearly by VK2AAK. VK7PF received portions of VK2AAK's call but no QSO resulted. VK7PF ran 100 watts to a 13 db antenna. Receiving antenna was twin 16 turn helix.

VK1VP: Orbit 11, tracked from 0754 to 1243Z. Using 30 watts output and 15 db antenna, could hear his signals clearly, but had to increase speed to 20 wpm as Oscar chopped signals badly. Beacon +20 db over noise and his signal +8 db over noise. Satellite was about 16,000 miles high at this time. Also heard VK2AAK this pass.

VK7PF: From 0144 to 0334Z, VK7PF copied a number of W calls, during the period of VK-W mutual visibility portion of orbit 15. He clearly heard W6GDO and W6FZA who were apparently in QSO through Oscar. At this time, Oscar was approximately 15,000 miles over the Pacific near 10 degrees south and 157.1 degrees east. VK3AEE also reported unidentifiable W calls about 0322Z. As far as is known, the VK-W reception is the longest recorded transmission through a communication satellite, including Syncom and Early Bird.

Please send your reports and comments to Project Oscar, Foothills College, Los Altos Hills, Calif. Thanks to all who have cooperated in this experiment and please pardon us for not answering mail at this time! We appreciate your letters and -- rest assured-- they are well read!

Moonbounce Newsletter

by Victor A. Michael, W3SDZ
Box 345, Milton, Penna.

Parabolic Antenna Construction

As I promised last month, here is a discussion of how to go about constructing your own parabolic dish. This can't possibly be a nuts and bolt type of discussion, as available materials, size of antenna, available tools, and many other factors will influence your construction. What I propose is a discussion of how to determine "what" you have to do.

The first important consideration is the size of the antenna you wish to build. The real consideration here, is the band you wish to use. On 432, the minimum size antenna you should consider is 26 feet diameter. On 1296, the size is reduced to 18 ft., while you need a sixty foot size for two meters. If you want to work on 432, there is no point in building a 15 foot antenna, as you can do as well with a well made phased array. In the size catagory, you must also consider what the largest diameter dish you might eventually want to build. If you will take the time to give some serious thought to this, you can start with a minimum size and later increase the diameter in steps up to the ultimate full size. To understand this, let us look at Figure A. This figure shows you how to establish the parabolic curve. A practical note at this point might help. The simplest way to lay out the curve is by ray tracing. The idea is explained in the caption for Figure A. I placed two 4' x 8' sheets of plywood end to end to form a rectangle 4' x 16'. Then, parallel to the 4' edge and at an exact right angle to the front 16' edge, draw a line each 6 inches to form a grid of parallel lines. This will make it easier to form the right angle in the ray tracing. You will find that for a focal length over 15 feet, ray tracing the curve every six inches will yield a very accurate surface. I used #18 wire for the "ray string". The only thing to watch is the wire stretch. The way to check yourself is to go back to the first ray trace point to see if it is the same after you have completed all the other points. You will probably find that it will take a few runs to get everything accurate. Once the tracing is complete, you can use the outline to lay out any type of former of any material you desire.

In considering the size dish you wish to build, you must also give careful thought to the focal length you will use. As an example, you can build a thirty-foot dish with a focal length ranging from five feet to thirty feet. There are some pretty good reasons for using a focal length around 15 feet, and this is where we meet a term known as F to D ratio (F/D). F is focal length and D is diameter of dish. If you will examine this concept a moment, what happens to cause problems, is that the illumination angle changes with the F/D ratio. As the F/D gets smaller, the illumination angle increases and can get to a point where it gets extremely difficult to illuminate the entire surface of the dish. Figure B shows the illumination angle for F/D of the most practical values for amateur use. A look at E and H Plane patterns of even a simple dipole and reflector indicates that once you go below .5 F/D it becomes difficult to properly illuminate the entire reflector surface. You should think in terms of a focal length that will give an F/D of .75 for the smallest size dish you intend to build and .35 when it is at it's largest diameter. As an example, you could start by building a thirty-foot dish with a focal length of 22 feet. The F/D would be .73, and you could add extenders to bring the dish to 50 feet at which point the F/D would be .44. Later the dish could be extended further to 63 feet and an F/D of .35. The important concept to remember, is that the focal length of the dish determines the nature of the curve. Once you establish the focal length, you can extend the diameter, but the focal length will remain the same. Thus, the F/D will drop as the diameter is increased, so decide on the diameters of dish you will want, pick a focal length that will provide a reasonable F/D over that range, and you can start on your dish project.

Method of Former Layout for Parabolic Reflector

The line VF represents the Focal Length. Lay this line out full scale on a flat surface. Next lay out line AA' perpendicular to VF. As stated in the text, I used two 4'x8' sheets of plywood laid end to end using the 16' edge of the plywood to represent line AA'. Since only half the former need be traced, I used the bottom 4' edge of the plywood to represent line VX.

The next step is to fix a nail of other pivot point at F and attach wire to the pivot. Now stretch the wire from F to V and back to X. Carefully mark this point on the wire. Now by moving point X on the wire along line AA' to each of the grid lines mentioned in the test, and keeping line PS aligned with the grid lines. The point where the wire folds back at P is the point of the parabolic curve.

Thus, you see that all waves from an isotropic source at the focus that are reflected from the parabola arrive at line AA' with equal phase, forming a uniform plane wave.

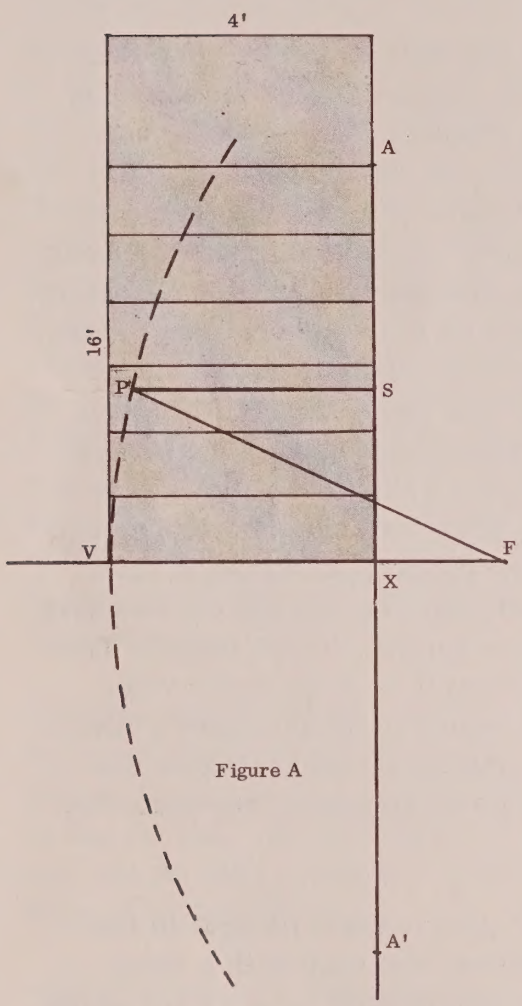


Figure A

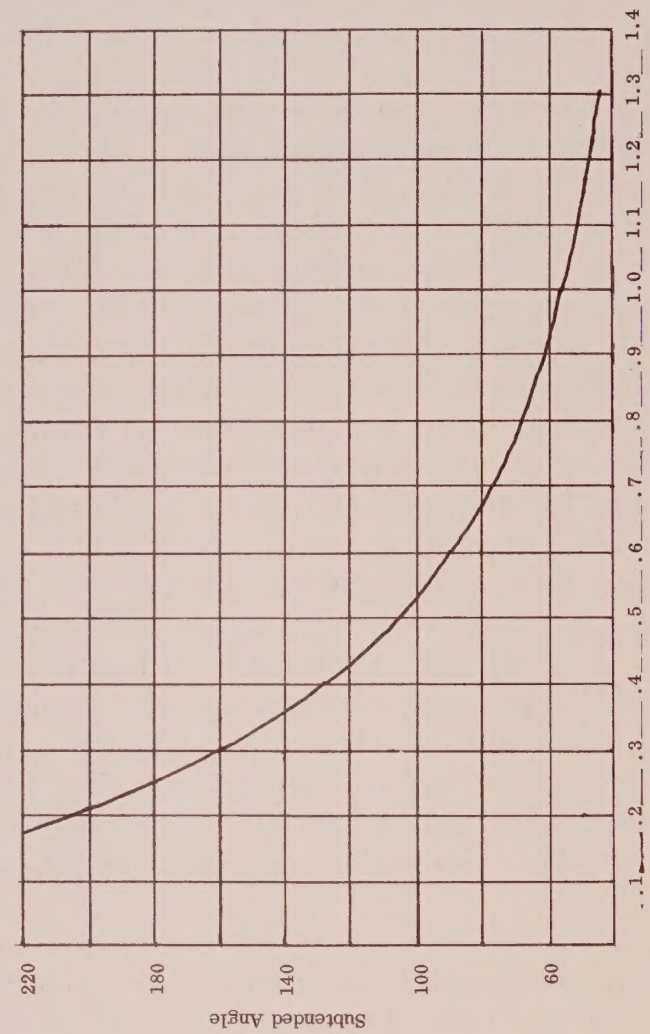


Figure B

Gain Table for Parabolic Antenna

FREQUENCY — Antenna Size in Feet

MC	10	15	20	25	30	35	40	50	60	80
144	10.5	14	16.5	18.5	20	21.5	22.5	25	26.5	29
220	14	17.5	20	22	24	25.5	26.5	28.5	30	32.5
432	20	23.5	26	28	30	31	32.5	34	36	38.5
1296	29.5	33	35.5	37.5	39	40.5	41.5	43.5	45	47.5
2500	35.5	39	41.5	43.5	45	46.5	47.5	49.5	51	53.5

Gain is expressed in DB over isotropic

While the design information I have just given may be condensed, I think it represents most of the essentials. Any specific problems which may develop, drop me a line and I'll be glad to help. In addition, there are some good reference sources I'd like to mention for the advanced VHFER that can be a big help in antenna work for not only dish design, but general antenna work as well. One excellent book that covers just about all phases of antenna design and is fairly well up to date is Antenna Engineering Handbook by Henry Jasik and published by McGraw-Hill Book Co. This book is a good blend of both practical and theoretical information. Another excellent book on parabolic antenna work is the MIT Radiation Laboratory Series Volume on antenna design. It is available at a reduced price from Boston Technical Publishers, Inc., Box 111, Cambridge, Mass. 02139. It is #14 of the Series titled, "Microwave Antenna Theory & Design" by Silver-Price at $5.50, which used to be $12.50.

One other practical note concerning materials. I realize each person will have some personal preferences, but I can mention some materials that are good and others that are not so good for the reflector material. The general requirement of the reflector material is that the holes in it must not be greater than about .1 wavelength. When you use a material with a square hole, remember the hole size for RF is not the size of the square, but the diagonal across the square. This generally means that quarter inch square holes should be good through 1296 MC. While doing some planning for our new large aperature moon-bounce array, we made some measurements on aluminum window screen. This is far less expensive than hardware cloth and is much lighter. Some extremely accurate measurements were made at 10KMC. The results showed that the screen works very well even at this frequency, so it will work for any amateur work below 10KMC. The real problem no matter what material is used is surface tolerence. This is a bit harder to achieve with the aluminum window screen, ie: you have to support the window screen at more points than you do hardware cloth. My dish is covered with hardware cloth. The main disadvantage is cost and weight which can be overcome somewhat with the aluminum screen. One material which sometimes looks good, but really isn't is chicken wire. This material tends to develop problems of an electrical nature which are complex to explain — but make for some strange results at 432.

Next month I will take some time on the mounting arrangements that can make the dish point at the Moon. I've built several mounts — some good — some not so good, that we will examine in detail. I might suggest a look at my QST article of January 1965 on the principles of the polar mount, as I will pick up the mount discussion from that point on.

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220 MC TRANSMITTING CONVERTER

by Dale Matthews, WA6TXH*

*513 K Street
Rio Linda, California

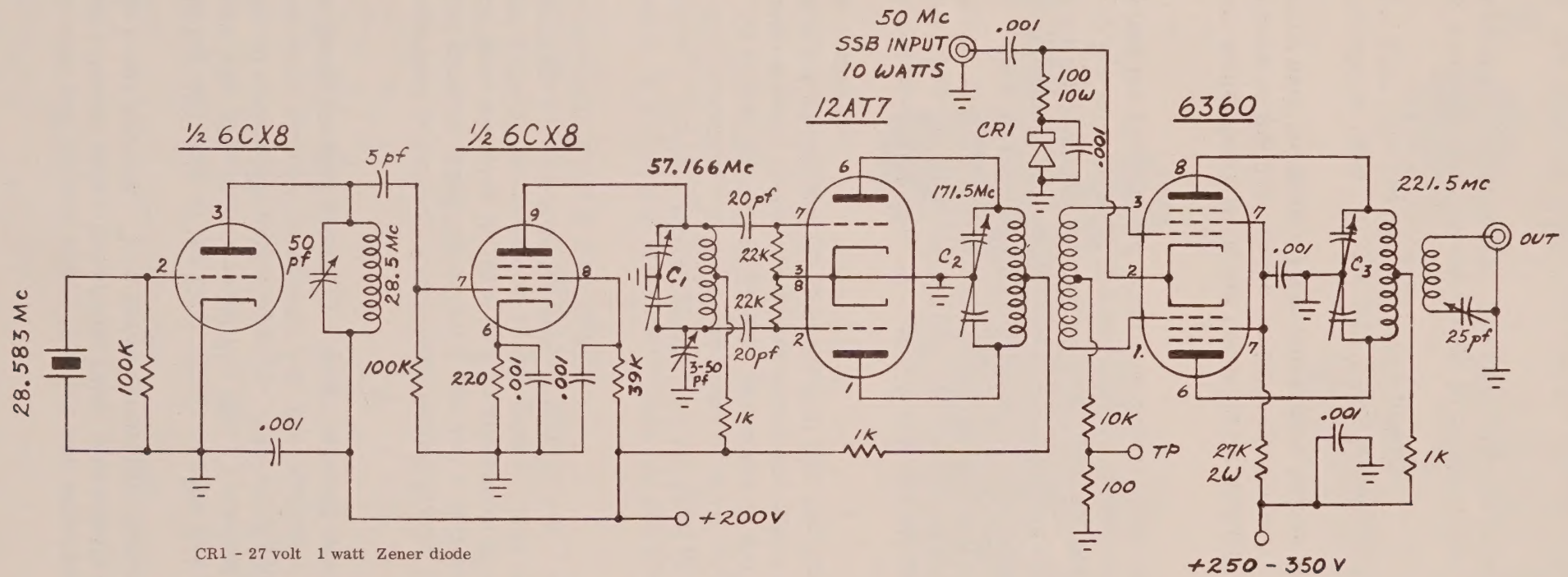
The converter described in this article was settled upon after trying several methods of obtaining 3-5 watts output on 221 MC SSB from a 6360 mixer. I have built three of these units and have obtained similar results from each unit. Several variations of each circuit were tried in an attempt to determine what difficulties could occur if the builder introduced some ideas of his own. No difficulties were encountered that were not easily met, and the end result was a stable 3-5 watts output on 221 MC, depending upon the voltage applied to the mixer unit.

The 6CX8 oscillator-doubler was used after it was found possible to obtain slightly more doubler output than with a 6U8 or 6EA8 type tube. The use of a GDO was invaluable in the construction of the units. All coils after the oscillator were wound on one fourth inch rods and then removed from the rod and placed in the circuit. This type of coil construction was well suited to the type of design used in this converter. The oscillator plate coil was wound on a three eights inch slug-tuned coil form and tuned with a variable capacitor. The variable capacitor could be omitted and replaced with a fixed value of approximately 30 PF and then resonated with the slug. The 3-30 mmf. variable in the bottom side of the 6CX8 doubler stage should be adjusted for maximum 6360 grid current by alternately tuning the padder and adjusting the main plate tuning capacitor. The 12AT7 tripler was found to give more than enough output to drive the 6360 mixer. A 6360 tripler was also used in one variation of the unit, however, the expense of the tube as compared to the 12AT7 did not warrant its use. The 6360 tripler, while giving more mixer grid current did not give any appreciably more output from the unit. The mixer grid current required to give suitable operation was in the neighborhood of one and one half to two milliamperes. The grid coil of the mixer is four turns of # twenty wire and adjusted to resonance by varying the spacing of the coil. Coupling was adjusted by physically varying the spacing between the tripler plate coil and the grid coil. Final tuning was done by observing grid current and then squeezing the coil until it hit resonance by a sharp increase in grid current. Unless you are lucky, there will not be any indication of grid current at first until you adjust the circuits to resonance. My method of preliminary adjustment consists of using a GDO as a wavemeter and peaking each circuit until I begin to get a reading on the grid meter and then adjust all circuits by the grid current meter of the mixer.

The output coil is two turns of number twelve wire one inch in diameter spaced one half inch. The output link is one turn of number twelve wire one inch in diameter. The one hundred ohm mixer cathode resistor consists of four, four hundred ohm two watt resistors in parallel. The mixing level was ten watts at fifty Mc. This gave five watts output on 221 Mc. with three hundred and fifty volts applied to the mixer plates. Two hundred and fifty volts produced about 2.5 watts. These readings were on a Bird Thru-Line wattmeter with a ten watt element into my eight over eight J beam. The converter in use now at my station is the same as described in this article with the addition of a straight through 6360 amplifier. This gives me ten watts to drive my 4X250B amplifier, which is plenty.

Some variations included using 14 Mc. as a mixing frequency and a different oscillator-multiplier chain. Some feed through of the oscillator was experienced at the mixer stage, but one straight-through stage eliminated this. Another version of obtaining bias was by inserting a twenty-seven volt zener diode in the ground side of the mixer cathode resistor and bypassing it with a .001 disc. This proved to introduce no problems as was anticipated, so I made the change in my converter.

I am holding weekly skeds on 220 Mc. with WA6GYD in Saratoga and find that so far I have not run into any difficulties in several months of operating. I hope to hear some more activity up there as it is not very crowded now and could well use some support. Good luck on your project.



CR1 - 27 volt 1 watt Zener diode

C1, C2, C3 - EF Johnson 160 - 208 Butterfly

WA6TXH

220 Mc TRANSMITTING CONVERTER

A GRID DIPPER FOR 432 MC.

by "Benny" Hudson, W5LGW

Someone has said that 432 Mc. is where the men are separated from the boys. Whether this is true or not I do not know, but at any rate, practically anything needed to get on this band must be home brewed. To a large extent this includes test equipment.

When I decided to try 432, one of the first things needed was a grid-dip meter. As all the commercially built jobs give up at around 250 Mc., I started a search of the magazines and handbooks for an article on such a weapon. The ones I found didn't suit for one reason or another. They were usually too spread out, the oscillator being one piece and the power supply and meter being located remotely. Some seemed unfinished in that they were just an oscillator.

The one to be described is strictly a one-band dipper tuning from 405 Mc. to 455 Mc. It is quite sensitive and gives a sharp dip at even one and a half inches from the tuned circuit. While the inductor does not plug in, this has an advantage of long-time accuracy. It can be calibrated with a frequency meter or lecher wires. If it should happen to not tune all the way to 450 Mc. due to variations in circuit layout, etc., another inductor about a 32nd of an inch wider will make it tune higher.

It is built in a Bud 5" x 2 1/4" x 2 1/4" box. Take the box apart and use the side with ends. (One piece has sides.) Using a file or grinder on the bend at one of the ends, weaken it until it can be neatly removed. Next, cut a piece of 3/16" plexiglass to fit the end of the half with sides. Drill and tap with 4-32 tap, two holes in the edge of one side of the plexiglass. Make matching holes in the box piece where the metal has been removed. With a little care in this you should now have a box that fits together as well as before but now having plexiglass in one end.

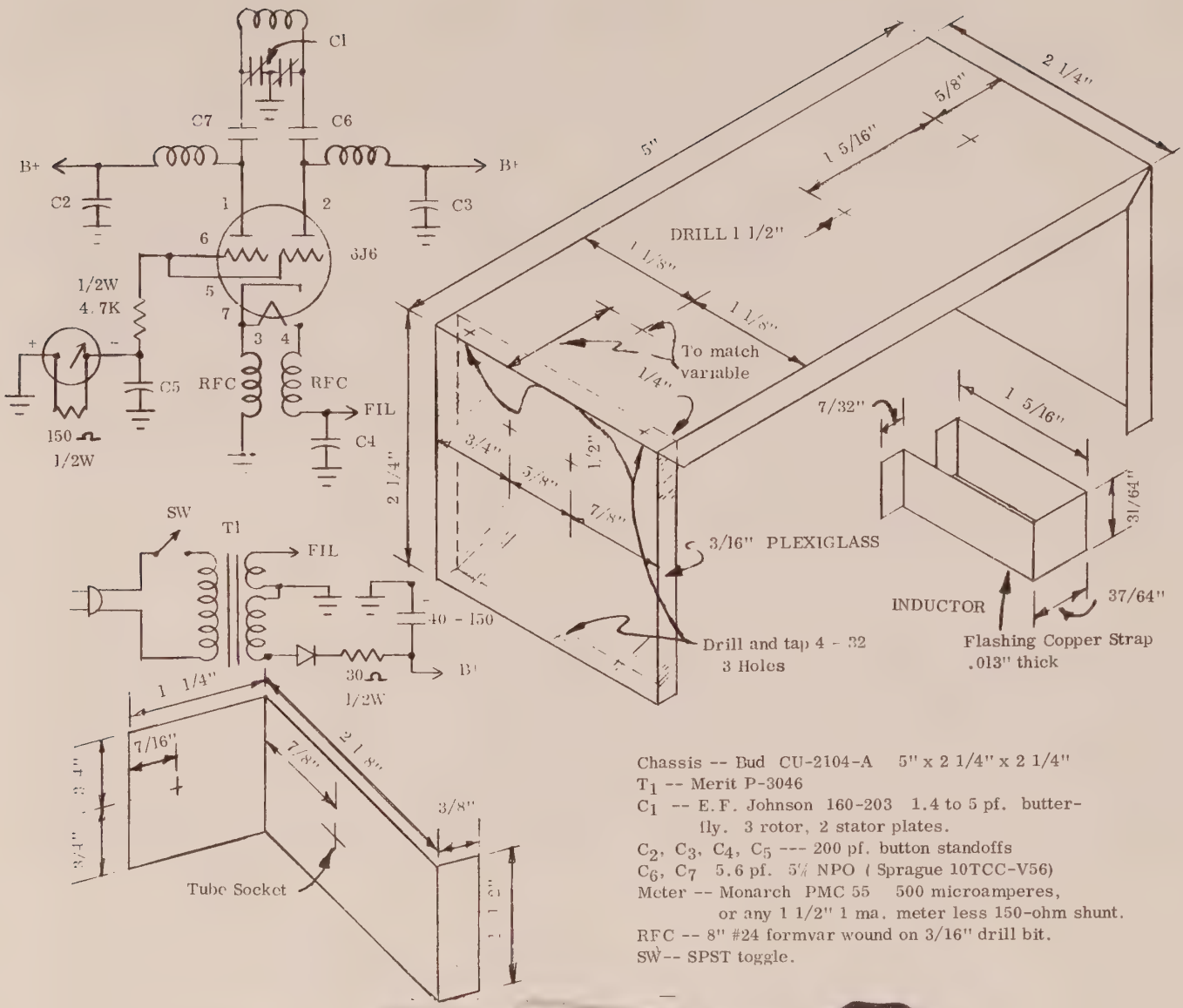
Next, using sheet copper, make the "Z" shaped chassis shown in the drawing. It is shaped thus to let the tube miss the meter and to put the pins closer to other components. Two points are important: get the hole for the tube socket and the one for the variable condenser located as shown. Also be sure that pins 1 and 2 on the socket are nearest this condenser. The button micas are mounted conveniently to serve as stand-offs for the RF chokes and grid resistor. All wiring on this chassis is done before installing it in the box. A matching hole is made in the mini-box for the butterfly condenser so that the 1 1/4" side of the chassis butts against the plexiglass. This will result in the shortest possible leads to the inductor.

Use 8-32 brass or copper bolts to mount the inductor and GC solder lugs (5705 C) reached exactly from the bolts to the lugs on the variable condenser. The wire leads on the 5.6 pf. condensers were used to make a firm connection before soldering these in place.

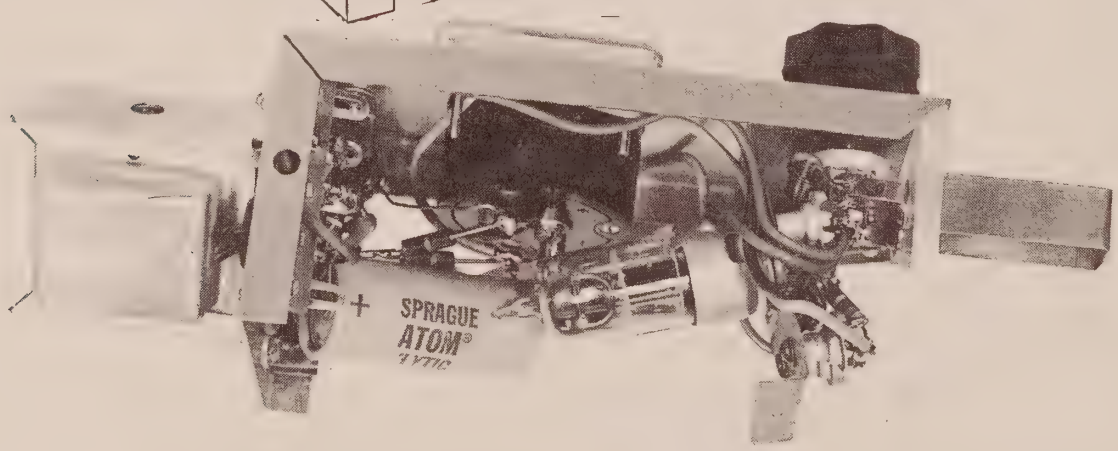
Any small meter could be used. A one mill meter would not require the shunt. The one used mounts in a 1 1/2" hole and is reasonably priced.

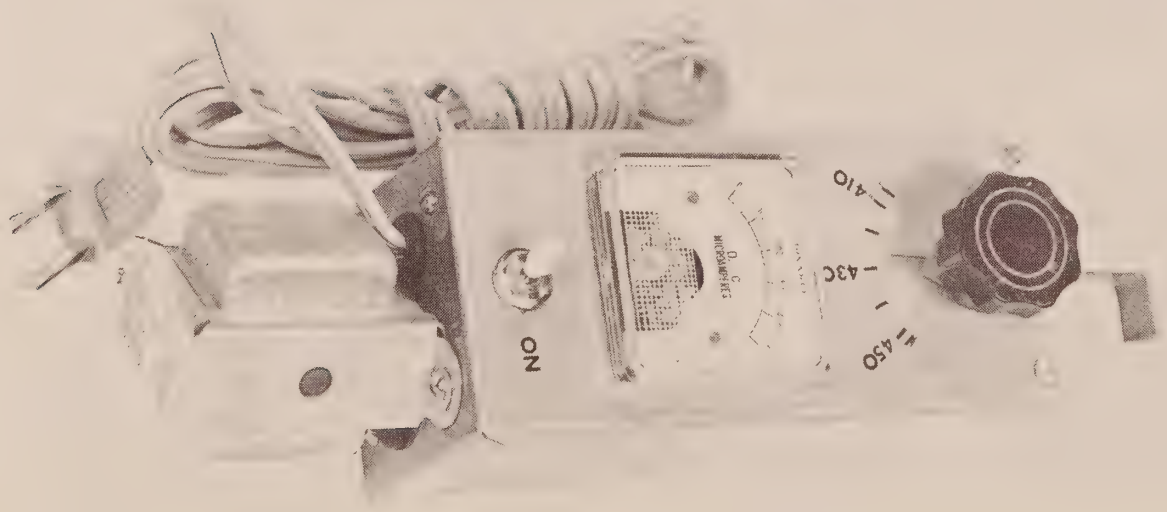
The power supply needs no description except to mention that the power transformer being on the outside was not an afterthought. The unit will run cooler with it here, thus eliminating drift.

If the tube socket, the butterfly condenser and the copper strip inductor are mounted as described and shown in the drawing, the unit will tune the frequency stated. I have built two of them. End of text. See diagrams and photographs that follow.



Chassis -- Bud CU-2104-A 5" x 2 1/4" x 2 1/4"
T_1 -- Merit P-3046
C_1 -- E.F. Johnson 160-203 1.4 to 5 pf. butterfly. 3 rotor, 2 stator plates.
C_2, C_3, C_4, C_5 --- 200 pf. button standoffs
C_6, C_7 5.6 pf. 5% NPO (Sprague 10TCC-V56)
Meter -- Monarch PMC 55 500 microamperes, or any 1 1/2" 1 ma. meter less 150-ohm shunt.
RFC -- 8" #24 formvar wound on 3/16" drill bit.
SW -- SPST toggle.





PICTURES OF OSCAR IV ON FRONT COVER

The pictures on the front cover are two of a set sent to us by the TRW Systems Amateur Radio Club of Redondo Beach, Calif. Captions for the pictures are below.

Fig. 1 shows the electrical components that comprise the TRW Systems RAC's Oscar IV Satellite. On the lower left, the large box is the 432 Mc. transmitter. Directly above the transmitter is the 144 Mc. receiver. Above the receiver, the small cylindrical module is the one-year timer furnished by Oscar, Inc. To the right of the receiver and below the timer is the box which contains the digital logic required for transmitting an identifying "HI" and a beacon signal each 10 minutes. Below the beacon logic is the Command Decoder enclosure. This box contains the logic that permits the Oscar IV transmitter to be turned off or on from a ground station. At the top three areas of the Oscar structure are the three antennas. These antennas provide the 144 Mc. input signal to the satellite receiver. At the bottom of the satellite (and of the photo) may be seen a portion of the 432 Mc. transmitting antenna.

Fig. 2 shows the Oscar Iv Satellite being assembled by three of the Radio Amateur Club members. From left to right are Herb Gleed, W6ZPX, who is shown placing the 432 Mc. transmitting antenna into position. He is being assisted by , second from the left, Archie Landry K6MSQ and D. Moore, who were responsible for much of the mechanical design. The launching cradle for the Oscar IV satellite is shown in the foreground. The launch and spin-up mechanism for Oscar IV is the spring in the center of the launch cradle shown at the bottom center of the photograph. The black covering on the satellite is made up of the solar cells which power it.

OSCAR IV AT PRESENT

This information may not be accurate but probably is. I think Oscar IV is unusable now for communications. For a while the fellows found that they could capture the repeater by leaving on their carrier and using f.s.k. The problem was that the beacon was running almost all the time. When it was attempted to use c.w. thru the satellite, the frequency instability of the repeated signal was so bad you couldn't copy. The beacon is still loud and clear tho as far as I know. You will recall that a number of predictions were made regarding frequency, bandpass characteristics, power required to get thru the satellite and the necessary receiver noise figure and antenna gain required to hear the signal. Most of those predictions turned out to be very much wrong. Part of it may have been due to the orbit but some others must have been a mis-calculation. At any rate it has been an extremely educational and interesting satellite with considerable value. Are you getting ready for OSCAR V?

MORE ON OSCAR in personal correspondence to K7AAD. From Art Hale, W4AWS in Orlando, Fla. "When I worked W6YK via Oscar 4, I was using your 432-2 barefoot and receiving via a 8/8 J-Beam. The beacon was about S2-S3 and W6YK peaked up to S-3. Was tilted up 55 degrees from horizontal and pointed about south. 800 watts on 144 Mc. 28 foot Yagi. PS W6YK was using one of your 432 Mc. preamps."

One of the most successful operators in any kind of 2 meter or 432 DX on the west coast is W6GDO in Sacramento area. Jay couldn't even elevate his 2 meter beam, but you'll see his call in the Oscar reports and here's what he did. I am pretty sure he does not have a California kilowatt. Just the ordinary mid-west type. He sent me this listing of confirmed QSOs thru Oscar IV.

Orbit Ø	W6YK-W4AWS	Orbit 2	DL9AR-DLØDB
Orbit 5	W6GDO-K6HCP	Orbit 10	W6GDO-K5WXZ
Orbit 12	WA2WEB-K2MWA/2	Orbit 15	W6GDO-W6FZA

Jay says the items necessary to work thru Oscar IV (before it went to pot) were full duplex capability (send 144.1, Rec. 431.944) with NO INTERACTION plus a second receiver continuously on the beacon. Jay uses a Parks 432-2 with a preamp made by W7UDM that uses a very low noise Motorola transistor. The contact between W6GDO and K5WXZ is a repeat of their Oscar III QSO. He says, "Al & I await Oscar V."

K2GUN in Scotch Plains, N.J. has been very active and I thought many of you would be interested in his commentsS Some are excerpts from a letter to Ed Tilton. " It was Dick, W2IMU, at the Crawford Hill Club (K2MWA/2) who first noticed that the beacon could be inhibited by a steady carrier and we ran tests with him on orbit 22. Using FSK here we found I could hold open the translator for periods of several minutes before my signal faded and the beacon recaptured the satellite. As long as the beacon is transmitting the translator is gated out of the circuit. The only time I can catch it is during the time it is sending HI. Of course if there are enough CW signals on during the HI the duty cycle will be large enough to accomplish the same thing but the pauses between letters, even at high speeds, will allow the beacon to come back on. I now have antenna separation and filters in front of the converter so I am able to listen on 432 while my carrier is on 144.1 Mc. I can listen to my own signals and copy others while holding back the beacon.

Good signals were heard from the following: Orbit Ø K6HCP, K2MWA/2, Orbit 2 UP2ON, W4WNH. I had a partial exchange with UP2ON. At the time I thought someone was telling me to move up 2 kc! The way the sigs were gated I got only portions of his call. This bothered me and when I got a chance I replayed the tape and sure enough, UP2ON is in there loud and clear. It is ironic because up until Oscar 3 I have spent a good portion of my 28 years of ham radio chasing DX on 20, etc. I guess I just didn't associate UP2 with 144/432 Mc. operation. Any other call would not have confused me. On orbit 5, KØRZJ, W9ZIH K6HAW, K6HCP, K2GUG heard. On orbit 17, HB9RG heard." Warren, K2GUN.

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432 MC. TRIPLER PARTS KIT

Here is a parts kit for the 432 Mc. rig described in the September, 65 VHFER. You can buy all of it or any part. And there's some rigid coax you can put with it if you want.

Kit of all parts and materials except 4X150 tube-----$40.00
Same as above, less blower ----- $30.00
Same as above less blower and socket ---- 20.00
432 tripler wired and tested with 4X150 tube supplied by buyer, no blower ----$40.00
Blower--100CFM 115 volts a.c. 60 cycle ----$10.00
Prices shown above are prepaid, parcel post within the U..S.

50-ohm rigid 7/8" diameter air dielectric spiro-line coax. Approx. 1 db. attenuation per hundred feet at 500 Mc. Maximum coil lengths are 50 feet. price is 25¢/foot, f.o.b. Beaverton, Oregon. For tripler kit or coax., write Deane Kidd, W7TYR, 12235 S.W. James St., Tigard, Oregon 97223.

OPEN BANDS

by Marilyn Wiseman, K8ALO

Well, here I am back in the shack again. No column for December? Being laid up in bed from a fall prevented me from getting the column to Loren in time for publication. Things are back to normal again and I sure don't feel bad about that. News has been slow this past month. Hope reports pick up some. Be sure to send me your reports by the 15th. My address: Box 103 Petersburg, Ohio 44454.

50 Mc. ionospheric scatter

Dec. 1 K7ICW (Las Vegas, Nev.) wrkd K5OOJ, K5HVC (Tex.) hrd W5SFW, K5DOA, W5AQS 1900-1933
Dec. 4 K7ICW hrd K7BBO/7 (Wash.) WØEYE (Colo.), K5HVC (Tex.) and many 6s.
Dec. 5 WB6GKK (Tustin, Calif.) wrkd K7BBO (Wash.), K6RIL, WB6FSC 380 mi. 0900
Dec. 11 WB6GKK (Calif.) wrkd W7CNK (Wash.) K7ICW (Nev.) 1130-1230. K7ICW (Nev.) wrkd K7BBO/7 (Wash.) and many Calif. stations 0750-0929.

Editor's note: I'm cutting this a bit short this time because the same calls appear over and over. These fellows have good equipment and know how to use it. Anyone running a few hundred watts input with a half way decent antenna can get on the air Sat. & Sun. morning and make 500 to 1,000 mile contacts. The purpose of the scatter listing was to encourage others to get on in the rest of the U.S. and try east-west scatter. That hasn't happened. Aren't there any 500 watt type stations east of the rockies with operators who can handle c.w. at 5 words a minute? K7AAD

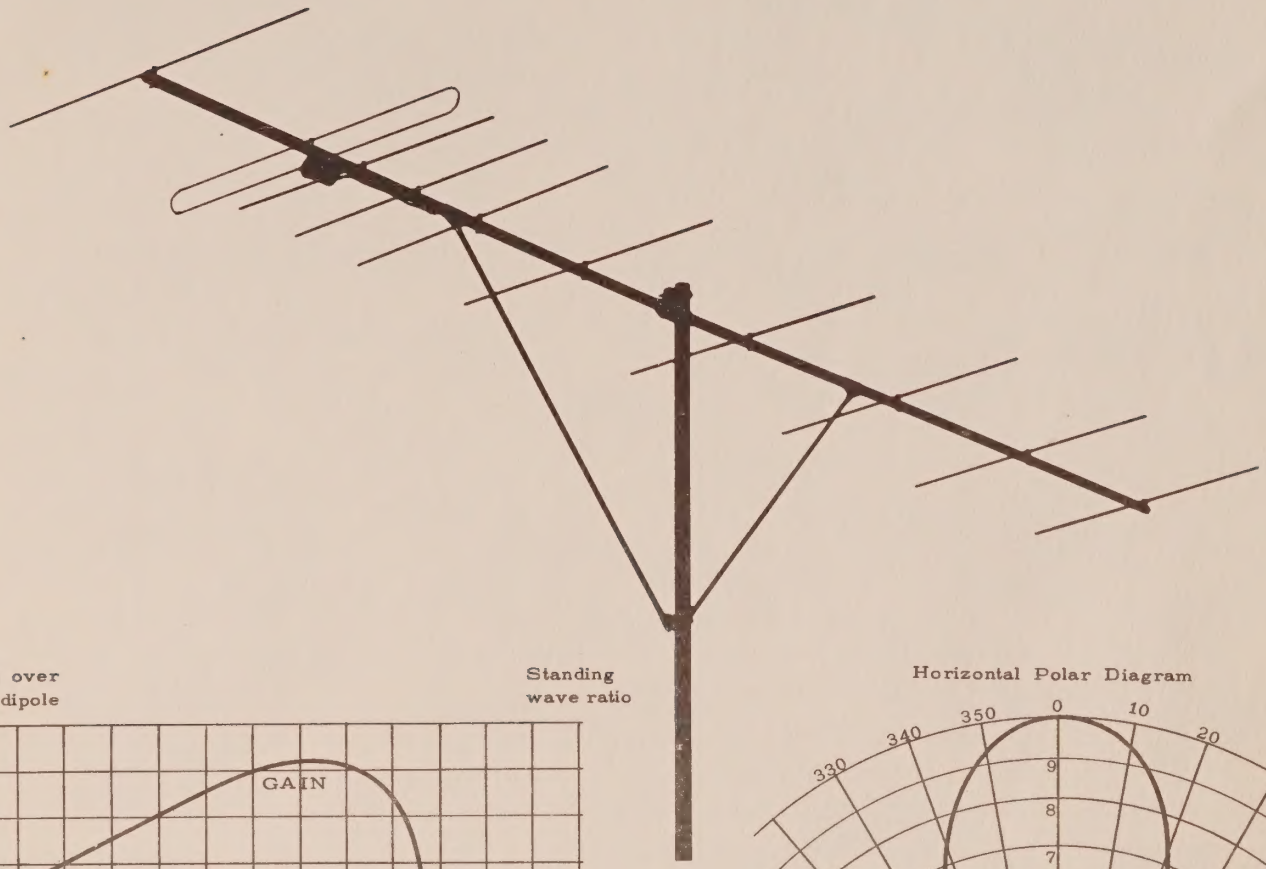
144 Mc.

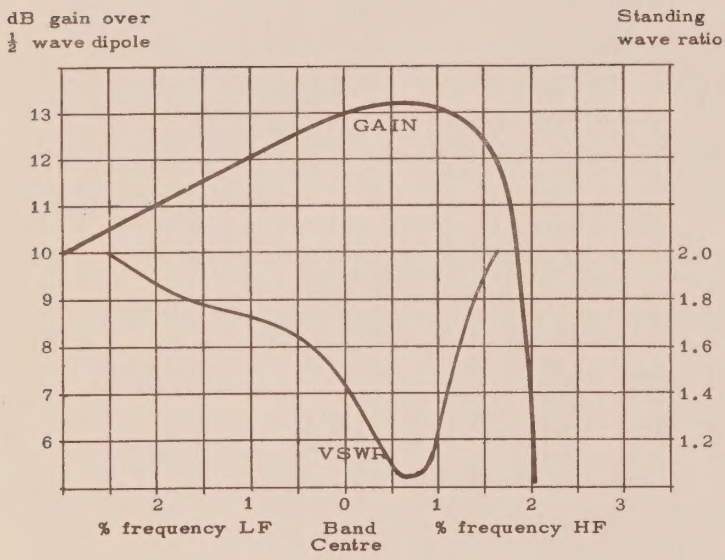
Dec. 11 K7ICW (Nev.) hrd WØYMG in Wichita, Kans. 0600-0630
Dec. 19 K7ICW (Nev) wrkd W7HDP (Great Falls, Mont.) 0916
Jan. 1 W3PGV (Wilkinsburg, Pa.) wrkd W9YOI (Mundelein, Ill.)
Jan. 4 W8SKP (Chesterland, Ohio, W3EUJ (Pa.) wrkd. WA9HQB (Ind.) W3PGV (Pa.) wrkd W9YOI (Ill.), Hrd K9HMB.
Jan. 9 W3ZJA (Pittsburgh, Pa.) wrkd VE1EF (Nova Scotia) 1810. W3PGV (Pa.) wrkd W4VCJ (Bluemont, Va.

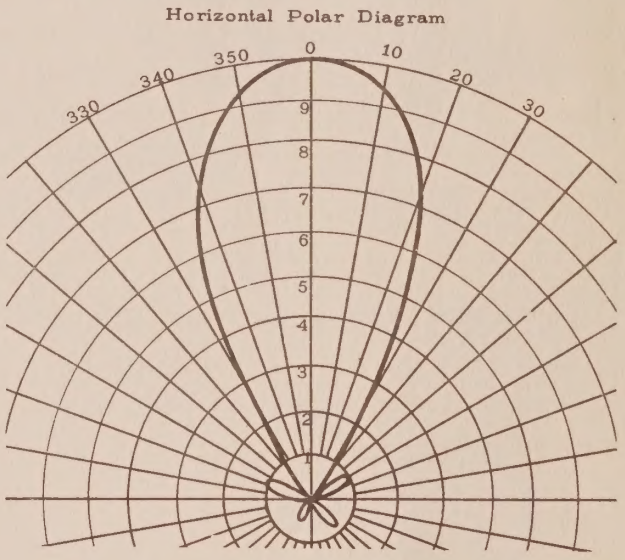
432 Mc.

Jan. 1 WA9HUV (near Chicago) wrkd W3RUE (Pittsburgh)--reported by W9OKB.
Jan. 4 & 5 W9OKB (near Chicago) wrkd W8YIO, W8FWF, W8RLT (Mich.), W9BRN (Ind.) W8VOZ, K8REG (Ohio), W3RUE (Pa.)

SKYBEAM





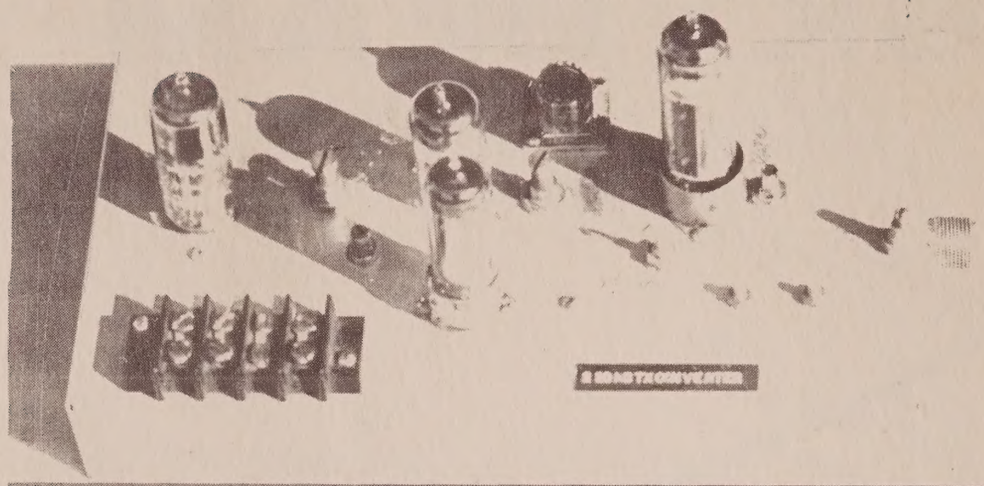


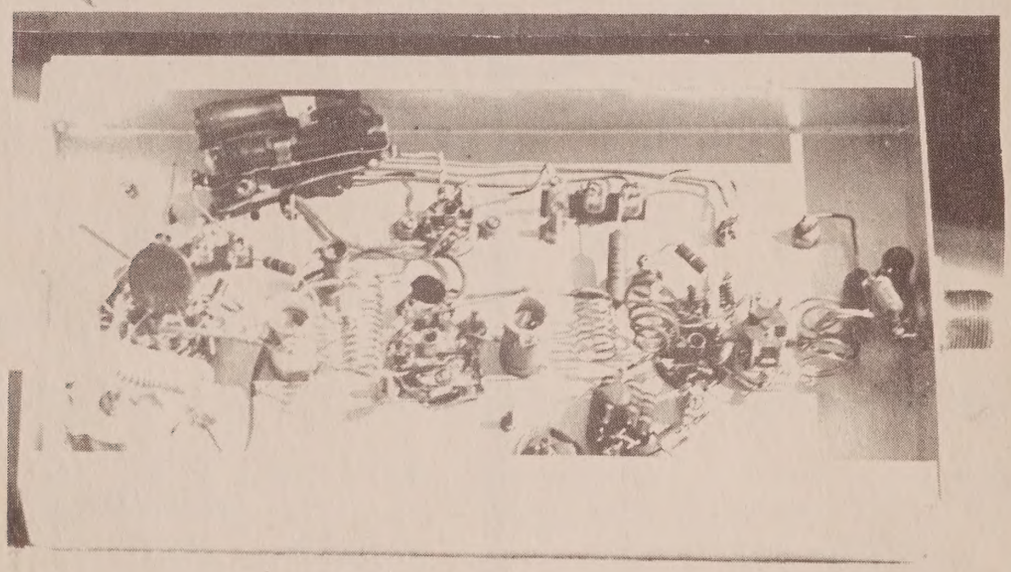
A PROVEN PERFORMER, this two meter SKYBEAM by J Beam Aerials, Ltd. of England. 13 db. gain over a dipole at 146 Mc., 15 db. over an isotropic radiator. Ruggedly built. Boom, elements and support rods of aluminum, 3 brackets of steel (plated). Available for feed with twin lead or coax. See the review in the May VHFER.

Write for literature and prices on this and other J Beams.

Gain, Inc. 27 E. 112th Place Chicago 28, Illinois

220 MC. TRANSMITTING CONVERTER DESCRIBED ON PAGE 8





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